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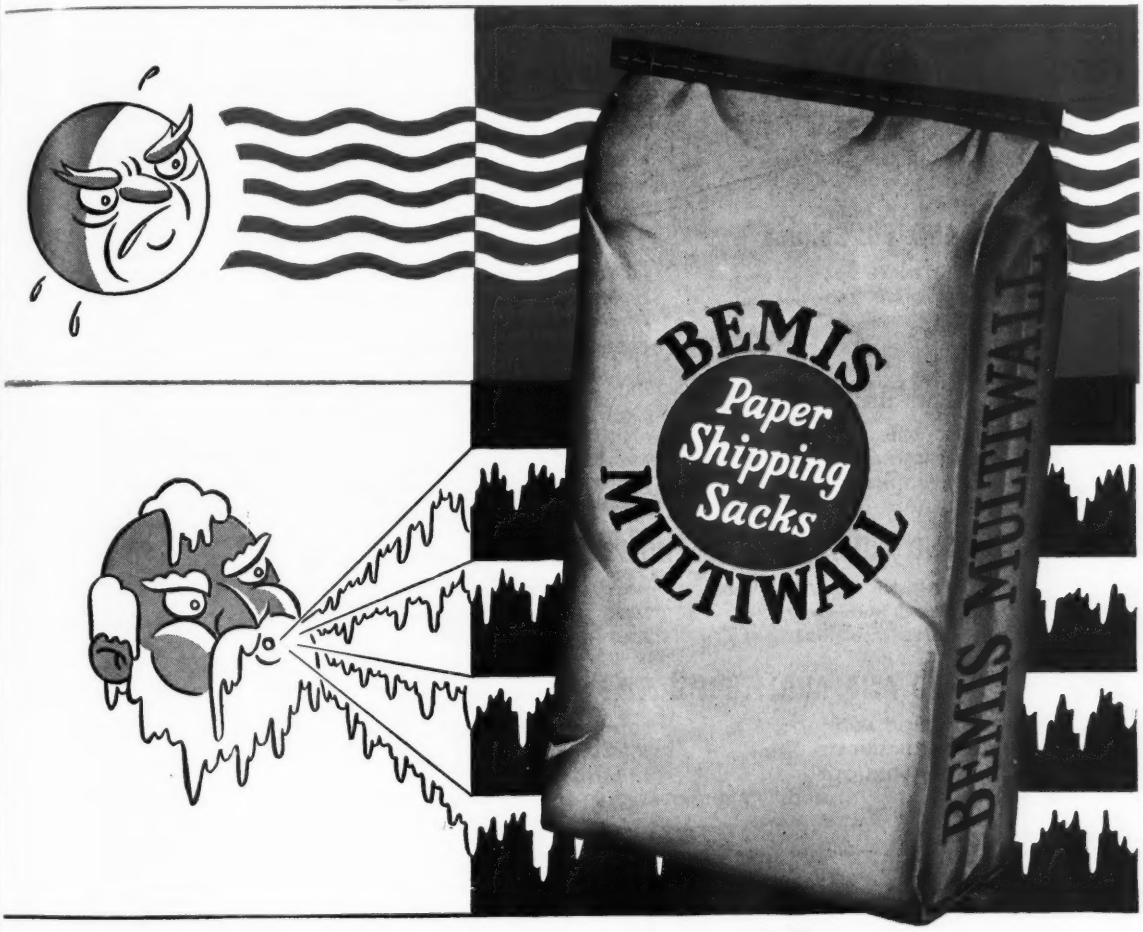

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AMERICAN FERTILIZER
&
ALLIED CHEMICALS

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SAM LEWIS VEITCH, *Publisher*
A. A. WARE, *Editor*
K. F. WARE, *Advertising Manager*

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Vol. 113 SEPTEMBER 16, 1950 No. 6

Table of Contents

THE COVER: *In the production of bumper crops, fertilizer and insecticide go hand in hand. What fertilizer produces, the chemical spray and dust must save from insect and disease if the farmer is to get full value for his expenditures on both types of agricultural materials.*

EDITORIAL

HOARD FERTILIZER

IN THESE days when the Government, the Press, the Pulpit, and Public Opinion in general are condemning the wave of "hoarding" purchases that has swept over the consumer market, we may be sticking our neck out when we urge the farmers of America to hoard fertilizer.

Not that there will be a shortage in supply. On the contrary, every survey of the field, both by Government and by private organizations, points out that the resources of materials and the productive capacity of the industry are adequate to fill all expected demands—providing production and distribution bottlenecks can be avoided.

The fertilizer mixer has already contracted for his materials and shipment schedules by the producers are being maintained almost 100 per cent. But, obviously, it will be a physical impossibility to mix and ship a whole season's tonnage in the three or four weeks before planting time. And the storage facilities at the plants could not be expected to handle such quantities.

With the industry-wide improvements in manufacturing processes and bagging methods, the farmer can be confident that fertilizer bought and stored during the fall and winter will be in perfect condition for use in the spring. And he will be able to plant at exactly the right time, instead of being subject to fertilizer shipping delays which may be even more severe than usual next year.

So it is with a clear conscience that we urge the industry to get behind a "Hoard Fertilizer" campaign. The industry associations are doing all in their power to stimulate early buying, as indicated by the following release recently issued to the farm press by the National Fertilizer Association:

"Will farmers have all the fertilizer they need for fall and spring plantings?

"Not unless they store it on their farms at once.

"That is the word which comes from The National Fertilizer Association in Washington.

"Although the industry is fully equipped to meet everyone's requirements, Dr. Russell Coleman, the organization's president, says that some farmers may be disappointed. Industry supplies now on hand must move steadily from the plants to the farm, he explains, so as to allow space for additional fertilizer to be produced and processed.

"Never has the industry been in a better position to provide farmers with all the fertilizer they require,' says Dr. Coleman, 'But never has the anticipated demand appeared so heavy.'

"Factors affecting the outlook: (1) Fertilizer use has steadily soared for the past 11 years. (2) Announcement that the Government will support the 1951 wheat crop at 90 per cent of parity. (3) Expectations that the Government will also hold supports up to the full 90 per cent of parity for cotton, corn, tobacco, rice and peanuts."

N. A. C.

Annual Meeting at Spring Lake

By
SAM LEWIS VEITCH

THE 17th Annual Meeting of the National Agricultural Chemicals Association is now a matter of record—but a very pleasant record, as this year saw the greatest attendance the association has had to date.

On September 6, 7 and 8, the members took over the Essex & Sussex Hotel, Spring Lake, N. J., just as they have done in the past recent years, only more so this time.

Not only was there a large attendance, but there was also an air of contentment surrounding the group. They talked freely and always without an alarmed viewpoint. The prospects of a full blown war did not seem to stymie their spirits. In fact, one gathered from the various conversations that everything would be well with their industry—come rain or shine.

Here is a quick sequence of their thinking. Why shouldn't they be happy, the total gain of the pesticide industry for this year was approximately ten per cent over last year, and last year the increase was 15 per cent over the year before.

The future position of benzol and chlorine gave cause for an eyebrow to be lifted here and there, but always an optimistic overtone prevailed.

The conventioneers could even give a strong reply to the question of shortages in the event the government makes demands on their materials. Some were thinking of the chemicals that were used some years ago, and readily admitted an excellent job could still be done with them. There seemed to be a feeling that the government might be a good customer; in any case the industry would continue to be prosperous.

Hart Speaks

THE association carded a splendid choice of speakers for its members. Ernest Hart, NAC president, opened the meeting with one of his heart-to-heart talks and told those present the industry will meet foreseeable increased demands for agricultural chemicals, provided a sufficient supply of raw materials is available. To quote Hart further "Industry's improved position to meet additional requirements results from almost revolutionary developments in the science of pest control and sizable increase in plant capacity." He further remarked: "During the past decade many new materials have been developed, tested, and marketed, which together with improvements in other products, have provided users with the means for more effective insect, disease, and weed control than ever before. Industry's materials have contributed greatly to the ever increasing efficiency of agricultural production. Plant capacity has been considerably expanded by industry during the past five years. However, some of this new capacity is in facilities which might be taken over by the government in a major emergency." All of which is a good summation of the industry's position. It might be well to add that it was estimated that last year a billion pounds of pesticide materials was used, and without equipment expansion the industry could produce two billion pounds. Mr. Hart radiated confidence to his audience and climaxed his talk by stating the industry had both the know-how and the capacity to do the job.

Something to Think About

THE executive secretary, Lea Hitchner, was next to speak. He gave all those within the auditorium something to think about when he told of some of the problems the members may face. He said there may be every reason to expect that many raw materials used by the industry will be urgently needed for other essential defense needs. On this possibility Hitchner said the U. S. Department of Agriculture, in cooperation with other agencies, should survey corresponding requirements for agricultural chemicals. A survey of this type should show the crops requiring protection, and the pests and diseases to be controlled.

Mr. Hitchner stated that NAC has already offered Secretary of Agriculture Brannan its cooperation, and its offer is now being considered by the Secretary.

Residue Tolerances on Fruits

THE importance of filing industry briefs as a contribution to the establishment of sound residue tolerances for agricultural chemicals used on fresh fruits and vegetables was stressed by John D. Conner, NAC counsel. Proposed tolerances may be announced by the residue tolerance hearing's administrator in time to guide state officials in making 1951 recommendations.

"The Hearing has been conducted in an atmosphere of mutual constructive cooperation between the Food and Drug Administration and all interested parties," Mr. Conner said. "Only through the continued cooperation, which includes the examination of evidence and filing of briefs by interested parties, can practical regulations be evolved which will be adequate to the consumer, the farmer, and the manufacturer."

AMA Probe of Pesticides

PROGRESS made in the evaluation of available information on the toxicity of agricultural chemicals and the interpretation of such studies will be printed in AMA publications at periodic intervals, according to Dr. Bernard E. Conley, secretary of the committee on pesticides of the council on pharmacy and chemistry, American Medical Association.

The committee on pesticides was formed in January, 1950, to offer guidance and to stimulate more active participation by physicians and allied professional personnel in the health problems of pesticides.

One of the major contributions that NAC can make to its final formulator members is more intensive dissemination of technical information, with particular emphasis on the new chemicals which are being marketed by the basic manufacturers and also those chemicals which are being tested experimentally over a large part of the country after they have left the laboratory, according to Mercer Rowe, Jr., Flag Sulphur & Chemical Company.

"In the same connection," he added, "I feel that the smaller companies, as well as the industry as a whole, could be benefited by having more coordinated information given us regarding packaging of insecticides and fungicides, particularly the more toxic materials which we are now using."

In general, the meeting was one of satisfaction with the progress made by the industry thus far. The days to come may be trying in some ways, but the net end result would measure to high levels when all the chips were down.


1


2


3


4

1. W. J. Liipfert, Woolfolk Chemical Works; James McConnon, McConnon & Co. 2. J. S. Chase, Port Fertilizer & Chemical Co.; J. Newton Hall, Julius Hyman & Co.; F. B. Maughan, Rohm & Haas Co. 3. Mrs. Henry J. Wood; Mr. Henry J. Wood, Tobacco By-Products & Chemical Corp.; Mrs. Friar Thompson. 4. E. D. Whitman, Pittsburgh Plate Glass Co.; M. L. Somerville, Chipman Chemical Co.; W. F. Newton, Pittsburgh Plate Glass Co.

INFLUENCE OF GRANULE SIZE ON CROP RESPONSE

Crop Experiments in Germany with Granulated Superphosphate

By Vincent Sauchelli

Director of Agricultural Research, Davison Chemical Corp., Baltimore Md.

Well-known and generally accepted is the observation that limestone, rock phosphate, basic slag, and similar insoluble fertilizer materials have to be applied to soils in pulverized form to be effective as plant nutrients. The introduction of superphosphate and of complete fertilizers in granulated form at once raised the question of how granule size might influence nutrient efficiency. Some suggested that the larger granules might not release their nutrients rapidly enough to satisfy the needs of the plant during the early stages of growth. However, what these persons failed to consider is the solubility factor. Doubtless they judged the granulated fertilizers on the basis of the behavior of limestone and rock phosphate, which are insoluble to start with. Granulated superphosphate and complete fertilizers are prepared from materials already in water-soluble or readily available forms. They do not have to be ground to a fine mesh size to facilitate their solubility. In fact, the problem has been, under certain soil conditions, one of retarding the rate of diffusion of the phosphoric acid or potash into the soil solution and thus hold back the fixation process.

The scientific method of arriving at a definite answer to any problem is through measurement. If we can actually measure the effectiveness of the various sizes of granules in promoting plant growth, then we can feel satisfied that we have the answer or at least have something far better than a guess or a hunch.

Therefore, the following report of an investigation with granulated phosphatic materials sponsored by the German Fertilizer Manufacturers Association and conducted by the Agricultural Experiment Station at Hamburg, Germany, is welcome. Similar tests have been made at the government agricultural station in Stockholm, Sweden, and in our own country by the U. S. Department of Agriculture.

A general summary of these tests follows, starting with the German report.[1]

The Hamburg Station obtained samples of granulated superphosphate from producers in England, Sweden, and Germany, and used these in experiments during the period 1938 to 1942. They were stopped by war bombs. The conventional method was followed, which is to grow crops in Mitscherlich pots to the fruiting stage, weigh the dried vegetative growth, and finally analyze the ashed material. Soils were selected which were known to have strong phosphate-fixing powers, and were of a sandy, acid type, low in organic matter.

[1]Private communication from the Director.

I. First, the phosphatic materials from Sweden:

a. Granulated superphosphate, made from normal superphosphate.

b. A granulated product designated C 45: this was a normal superphosphate-Thomas slag mixture in which only about 50 per cent of the total P_2O_5 remained water-soluble.

c. A granulated product, designated C 42: this was the same as (b), a C 45, except that only 20 per cent of the total P_2O_5 remained water-soluble.

In 1938 two crops were used:

(1) Summer rye, on soil of pH 5.4 to 4.6.

(2) Red clover, on soil of pH 6.1 to 5.8.

The phosphatic fertilizers were uniformly applied at the rate of 150 kg. per hectare,[2] and each pot received the same maximal application of nitrogen and potash. The check plot had no phosphate applied. Table I summarizes the findings: the yield of the fraction, "finer than 0.5 mm = 100"[3] served as a base of comparison.

[2]Kg. per hectare × 0.9 = lbs. per acre.

[3]1 mm = 0.039 inch, equal to openign in sieve No. 18, having 17 meshes per lineal inch.

TABLE I. GROWTH OF RYE AND RED CLOVER: INFLUENCE OF PARTICLE SIZE ON GROWTH

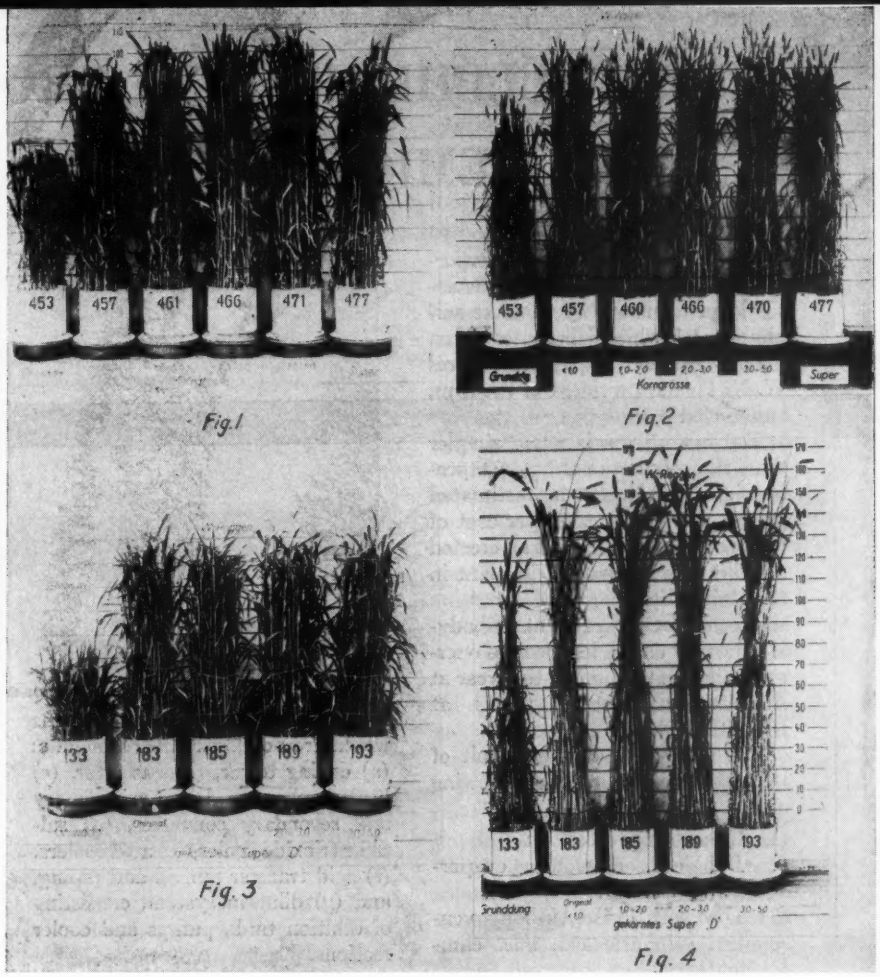
Fertilization	*Granule Size mm*	*Yield Relationships*	
		S. Rye, Petkuser	*Red Clover*
Check Plot		61.6	70.1
Basic Fertilization			
Plus granulated superphosphate	<0.5	100	100
	0.5–1.0	100.7	98.3
	1.0–2.0	102.7	110.4
	2.0–3.0	107.3	111.0
Plus test product C 42	<0.5	100	100
	0.5–1.0	94.6	113.0
	1.0–2.0	84.5	105.9
	2.0–3.0	87.1	93.8
Plus test product C 45	<0.5	100	100
	0.5–1.0	99.5	105.9
	1.0–2.0	105.5	107.9
	2.0–3.0	104.3	103.1

Comments on Table I

It is evident that the granulated superphosphate had a considerable effect on the rye and clover: with increase in size of the granules occurred a significant increase in yield. The fraction 1–3 mm gave higher returns of clover than that below 1 mm.

Product C 45 which contained a large proportion of water-soluble P_2O_5 also effected a larger increase than the fine granules. Despite the strong fixing powers of these soils, it is evident that the granule form retarded the fixation process and permitted a larger amount of soluble P_2O_5 to become accessible to the crops, and that the larger-sized granules give better returns than the finer.

Product C 45 exhibits the same tendency toward rapid fixation that is shown by the fractions up to and including that of 1–2 mm of the other superphosphates. However, the results induced by fraction 2–3 mm of this difficultly soluble phosphatic fertilizer confirm the observation that in the case of insoluble materials the large-sized particles are much less soluble than the finer and it is best to grind such materials to a fine mesh-size. We see this very sharply in C 42 where the combined effect of size and phosphate solubility of the fraction 0.5–1 mm gave an increase in clover of more than 13 per cent than the fines less than 0.5 mm, but this increase dropped by 5.9 per cent in the case of the 1–2 mm fraction, and a decrease of 6.2 per cent for the 2–3 mm fraction. Fixation is strongest on the very fine particles, as would be expected.



German Phosphates

II. Results obtained with the phosphatic compounds produced in Germany, which were:

Superphosphates:

a. Granulated superphosphate, known in the 1938–39 tests under the name, Product B.
b. Ditto, but designated in the 1939–40 tests as Super D.

Table II gives the chemical analysis of the individual fractions used in these tests.

Rate of application. The phosphatic materials were applied at the rate of 100 kg. per hectare, and each pot received a foundation fertilization of nitrogen and potash as in the previous series of tests. The fertilizer sample contained, by count 95 granules of the coarsest fraction, enough to make a uniform distribution.

The Experiments, 1938–39. Crop, winter wheat, v. Heines III, short. Soils: pH 5.3 to 4.5, sandy loam, acid, low organic matter, strong P_2O_5 fixing power.

Figures 1 and 2 illustrate the growth in the respective pots which as numbered, represent the granule-sized material used, as follows:

Pot 453, check
Pot 457, <1.0 mm granules
Pot 461, 1.0–2.0 mm granules
Pot 466, 2.0–3.0 mm granules
Pot 471, 3.0–5.0 mm granules
Pot 477, normal superphosphate

In figure 2, Product B was used.

The photos were taken, in both cases (Figs. 1 and 2) at time of the appearance of the grain heads and shortly before the blossom stage respectively. The growth clearly

(*Continued on page 30*)

TABLE II. PHOSPHATE ANALYSIS OF INDIVIDUAL FRACTIONS

	P_2O_5			
Fertilizers	*Total*	*Water-soluble*	*Free*	*Citric acid-soluble*
Normal superphosphate <1 mm*	20.33%	19.35%	.....	.....
Granulated super pulverized <1 mm	17.98%	16.92%	2.67%	.....
Granulated super <1 mm	18.76%	17.08%	1.96%	17.81%
Granulated super 1–2 mm	17.57%	16.78%	2.62%	17.15%
Granulated super 2–3 mm	17.58%	16.75%	2.51%	17.20%
Granulated super 3–5 mm	17.62%	16.75%	2.66%	17.22%

*Only used for 1938–39 tests.

NEW SULPHURIC ACID PROCESS BY CHEMICAL CONSTRUCTION CORP.

Chemical Construction Corporation, New York, has developed a new way to make sulphuric acid which eliminates seven major items of equipment, General W. N. Porter, president of the firm, announced recently.

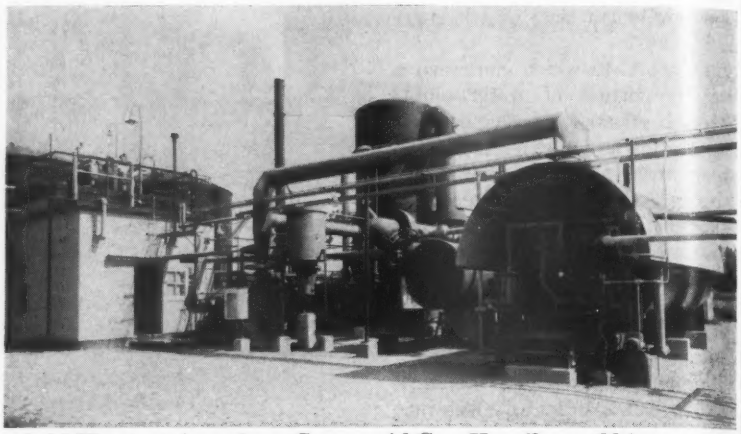
The new design is much simpler than the conventional contact process and represents an estimated saving of as much as 20 per cent of the present capital cost of an erected medium size sulphuric acid plant in the United States.

A commercial-size plant embodying the new design has been in operation since early June of this year at American Cyanamid's works at Hamilton, Ohio.

The new process is the result of the development of the following units:

(1) Quench converter.
(2) Bubble absorbers, using evaporative cooling.
(3) Low cost Pease-Anthony venturi sulphuric acid mist eliminator.

As will be seen from the flow diagram, the new sulphuric acid process eliminates seven major items of equipment. Traditional components



Acid Plant at American Cyanamid Co., Hamilton, Ohio.

of conventional contact installations which are no longer needed include: (a) drying tower, (b) gas filter, (c) heat exchanger between primary and secondary converter, (d) sulphur trioxide cooler, (e) acid coolers, (f) acid transfer pumps and piping, and (g) dilution system, consisting of dilution tank, pumps and cooler sections.

Quench Converter

Elimination of the drying tower made it necessary to omit all heat exchange surfaces as potential corrosion hazards. The quench-type converter was developed to solve the problem of interstage cooling.

Catalytic oxidation of sulphur dioxide is carried out in four successive stages. Temperature control is effected by admitting cold, atmospheric air between the converter stages.

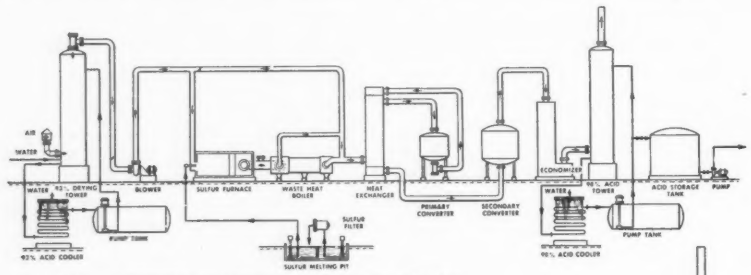
With burner gas containing 12 per cent sulphur dioxide by volume and using a catalyst loading equivalent to that of conventional contact converters, conversion of SO_2 to SO_3 in excess of 99 per cent is consistently achieved. For all practical purposes, this conversion represents an equilibrium yield.

Bubble Absorbers

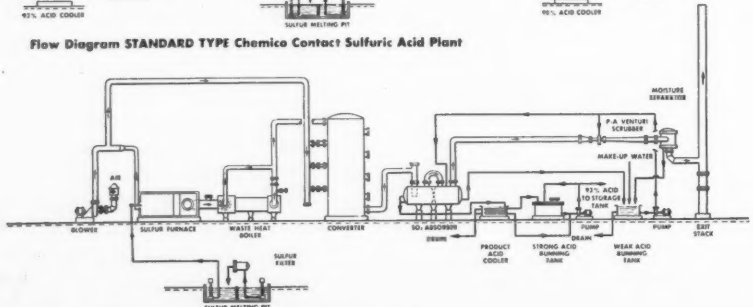
The new absorption system represents one of the truly novel and original parts of the process. The entire heat load provided by the sensible heat of the gases leaving the converter as well as the heat of formation of the sulphuric acid is removed by latent heat of evaporation of water vapor in a staged absorption system.

Plants of this design will produce acid up to 95 per cent sulphuric acid strength. It is possible to produce lower concentration without using additional equipment. Acid trans-

(*Continued on page 28*)



Flow Diagram STANDARD TYPE Chemico Contact Sulfuric Acid Plant



Flow Diagram NEW TYPE Chemico Contact Sulfuric Acid Plant

A NEW SYSTEMIC INSECTICIDE

By W. Scott James

Pittsburgh Agricultural Chemical Company, Pittsburgh, Pa.

Just as modern science has brought to the American home the amazing luxury of the automatic dish washing machine, television and many other products of aggressive research studies, the biological and chemical scientists have given agriculture modern chemical compositions. The action of many of these chemicals and the results received from their use are extremely interesting and are often substantial contributors to the reduction of agricultural production costs.

One group of these chemicals is organic insecticides and of this group some of the most modern types are those compounds having systemic properties. With the coming of several new organic insecticides and the study of their characteristics, it has been found that some of the new compounds are absorbed by the roots, leaves and stalks of certain plants. Research revealed that the parts of plants which had absorbed the insecticide and were attacked by insects were highly toxic to the attacking pest. The plants have been found to be toxic to certain insects long after spray residue has been dissipated by weather and normal chemical break down. The absorption of chemicals by leaves or roots of the plant, which is then redistributed throughout the plant, is known as translocation. Insecticides absorbed by the plant and translocated, when toxic to insects feeding on such plants, are known as systemic insecticides.

Most of the research data thus far demonstrates the pronounced susceptibility of sucking insects to systemic insecticides, indicating the presence of the insecticide confined to the plant juices instead of being generally present throughout plant tissue. This observation, however, is not necessarily consistent, as demonstrated in recent research.

Systox

As a result of many research studies carried out in the development of Parathion, now a widely used organic phosphate insecticide, there has been developed a chemical having systemic properties known as octamethyl pyrophosphoramide, and many interesting results have been received from the use of this systemic insecticide. The organic chemist and the entomologist have continued their studies and have now produced another phosphate having even greater possibilities as a systemic poison than the octamethyl pyrophosphoramide. Toxicological studies show that this new systemic poison will be no more toxic to human beings than Parathion and several of the other organic phosphate insecticides. This new chemical described by research workers as E-1059 will be merchandised by Pittsburgh Agricultural Chemical Company under the trade name of Systox.

Systox is readily taken up by plants and remains in them for prolonged periods of time, killing aphids, mites and some types of chewing insects. Used as a spray solution it has given kill at much lower dosages than Parathion, and sprayed plants have remained toxic to insects for significantly longer periods of time.

Recent studies with regard to the translocation of Systox in the plant have demonstrated the travel of the poison to be predominately in the upward direction in the plant; that is, the chemical travels upward through the plant juices and tissue from a treated area. In tests where it was possible to graft a portion of an untreated plant to a treated plant, the grafted untreated portion became toxic to insects after a short period. However, in cases where a treated section of a plant was grafted to an untreated plant no significant control was received of insects attacking other portions of the plant, indicating that there is not a downward travel of the toxic ingredient.

The systemic insecticide may be used as a spray, making diluted applications to the plant or it may be applied to the soil in a water solution and absorbed by the plant. In many cases, seeds may be soaked in a solution of the chemical, thereby being absorbed and held by the young seedlings to give protection against several insects for a number of days. In an experiment, cotton seed was soaked for 1½ hours in various concentrates of Systox and octamethylpyrophosphoramide. After the treatment, the liquid was poured from the seeds and from the remaining liquid a measurement was made of the amount of chemical absorbed. The results of this work are shown in Table 1.

In another test, potato plants were watered with approximately

(*Continued on page 28*)

TABLE I

	Pounds of toxicant per 100 lbs. seed	*Average No. aphids placed on plant*	*No. live aphids after*		
			1 day	*2 days*	*3 days*
E-1059	1	60	6	0	0
	0.5	50	4	0	0
	0.23	63	6	1	0.5
	0.11	39	8	4	4
Octamethyl pyrophosphoramide	1.6	59	4	0	0
	0.76	48	3	0.4	0
	0.32	48	14	11	14
Check	....	47	34	42	50

Fertilizer Course in Technology

The Fertilizer Technology Short Course was held at the University of Maryland August 21–25. It was sponsored by the Fertilizer Committee of the Soil Science Society of America. Representatives of the teaching and research staffs from 25 states and representatives from the industry were in attendance. This course was unique in that it was the first of its kind ever given.

The papers were presented by technical workers from the industry and State and Federal soil scientists. Detailed discussions were given on the source and supply of fertilizer materials, and on many phases of the technology and processing of fertilizer materials and fertilizers. Time was provided for discussion after each paper and many additional points were brought up.

The course included observing certain of the manufacturing processes in fertilizer plants. A visit was made to the synthetic ammonia and nitrogen fertilizer plants of the Solvay Process Division, Allied Chemical and Dye Corporation, Hopewell, Virginia, on August 22. On August 24, a visit was made to the sulphuric acid, superphosphate and mixed fertilizer plants of the Davison Chemical Corporation, Curtis Bay, Baltimore, Maryland.

The papers given in this short course will be published as a monograph of the American Society of Agronomy. Announcement will be made when this monograph is available for distribution.

The subcommittee on arrangements for this short course was composed of Kenneth D. Jacob, Chairman; Randall J. Jones; Albin O. Kuhn and Maurice Lockwood.

U. S. Potash Promotes Gidney

The United States Potash Company, New York has announced that on September 1st Dean R. Gidney had been appointed to the position of sales manager. Prior to his promotion, Mr. Gidney had served as assistant sales manager.

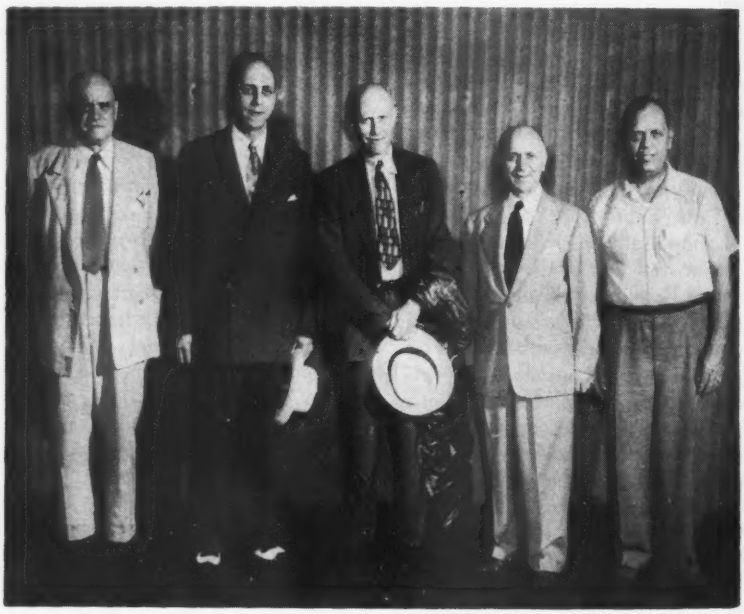
Davison Entertains Soil Scientists

About 80 of the nation's leading soil scientists and fertilizer technologists were guests of The Davison Chemical Corporation at the company's Curtis Bay Works on Thursday, August 24th. Among the visitors were representatives of industry, the agricultural colleges and State and Federal Agricultural Research bodies.

Vincent Sauchelli, Davison's Director of Agricultural Research, was host to the group who were taking a special course in fertilizer technology, sponsored by the Fertilizer Committee of The Soil Science Society of America. Most of the sessions of the five day course were held at the University of Maryland, College Park, Maryland. Mr. Sauchelli explained that the tour of Davison plants was a Field Day, entirely devoted to inspection of actual manufacturing operations in Davison's superphosphate, mixed fertilizer, and sulphuric acid plants at Curtis Bay.

M. G. Geiger, Executive Vice President of Davison, welcomed the group to the plant in a brief welcoming talk.

Mr. Geiger said, "In this great world, the population is ever increasing. The land is not. We, therefore, have a fundamental long range program before us. Certainly, it has many frustrations. We must conquer the knowledge of the soils of the earth. With confidence, we must stand before the farmer and continually teach him his needs. You, as scientists, know that this important field will never be sensational first page news such as atomic and hydrogen bombs. But in the long range picture, through knowledge of the soil, you will give the consumer the right plant food with the proper elements so that our resulting food stuffs will contain all of the elements necessary for the present and future health of the nation."



AMONG THE VISITORS AT THE DAVISON PLANT AT CURTIS BAY

Left to Right: George Callister, Food Agriculture Organization, United Nations; Maurice H. Lockwood, Vice President, International Minerals and Chemicals Corp.; Kenneth D. Jacob, Head, Div. of Fertilizer and Agricultural Lime, Agricultural Engineering, U.S.D.A.; Vincent Sauchelli, Director, Agricultural Research, The Davison Chemical Corporation; Dr. Joseph F. Fudge, State Chemist, Texas Agricultural Experiment Station.

New Duval Potash Refinery

Duval Sulphur & Potash Company, of Houston, Texas, is now building a new potash refinery at Carlsbad, New Mexico. The new plant, which is expected to be in operation within a year, will produce high grade muriate of potash.

The well-known firm of Ashcraft-Wilkinson Company, of Atlanta, Georgia, which has handled the sales of the Duval Company's sulphur output for the past twenty years, will also be the exclusive sales agents for the potash production.

Totman Appointed Brooklyne Trustee

J. E. Totman, president of the Summers Fertilizer Company, was recently appointed by the United States District Court of Maryland, one of the trustees of Brooklyne Chemical Works, Inc. of Baltimore, Maryland, manufacturers of copper sulphate and processors of other chemical by-products. Attorneys I. William Schimmel and Isaac Hecht are co-trustees. Brooklyne's total listed liabilities were approximately four million dollars of which about $1,250,000 were claimed to be secured. Total listed assets were approximately $2,700,000.

Mr. Totman's appointment was the result of a special request of the Court that a businessman with chemical experience, not connected in any way with the bankrupt, should be selected as one of the three trustees.

Changes in Barrett Sales Personnel

The Barrett Division, Allied Chemical & Dye Corporation have announced the following changes in personnel:

Walter S. Colvin has been appointed Sales Manager, Direct Application Materials, Midwestern District, with headquarters at South Point, Ohio. Direct application materials include Arcadian Nitrate of Soda, "A-N-L" Brand Fertilizer Compound and other nitrogen fertilizer materials distributed by Barrett for direct application.

Clifford Camp, Sales Manager, Direct Application Materials, Southern District, will continue to be located at Columbia, South Carolina

Borden S. Chronister, Chief Agronomist, Southern District, now has headquarters at Barrett's new office in Richmond, Va. Mr. Chronister was formerly located at Hopewell, Va.

C. A. Graft is now devoting his entire time to sales and service work on fertilizer manufacture materials, including nitrogen solutions, anhydrous ammonia and sulphate of ammonia in New England, New Jersey, New York and Pennsylvania. P. V. Whiting, a new Barrett representative, is taking over sales of Arcadian Nitrate of Soda and "A-N-L" Brand Fertilizer Compound in this same territory.

Jack F. Dulaney, a new representative, will handle sales and service on fertilizer manufacture materials in Alabama, Mississippi and western Tennessee. Mr. Dulaney will be located at Montgomery, Alabama.

Hercules Building Toxaphene Plant

A new plant for the production of toxaphene is being built by the Hercules Powder Company at Hattiesburg, Mississippi. To be constructed by the H. K. Ferguson Co., of Cleveland, Ohio, the operation will cost about $1,500,000 and will be completed by February, 1951. The new facilities will increase the Company's output of toxaphene by almost 50 per cent.

Hercules, which has operated a similar plant at Brunswick, Ga., since 1947, produces only the basic toxaphene, which is used by insecticide formulators in preparing agricultural dusts and sprays. The Hattiesburg plant was planned to serve the South-Central cotton-growing regions.

CLASSIFIED ADS

Position Wanted

PLANT ENGINEER, 35–45; Experience with building, revising and remodeling; knowledge of layout and plant services, machinery and equipment, production methods, maintenance problems, etc. Able to prepare, edit and revise mechanical and construction drawings, and advise on changes and improvements. Prefer experience with commercial fertilizer plants. Old established company, Midwest. Address "315" care AMERICAN FERTILIZER, Philadelphia 7, Pa.

FERTILIZER MATERIALS MARKET

NEW YORK

Little Change Reported in Materials Market. Ammonium Nitrate Price Increased. Feed Market Taking High Grade Organics. Demand for Fertilizer Organics Strengthens. Triple Super in Good Demand.

NEW YORK, September 13, 1950

Sulphate of Ammonia

A routine movement of this material was taking place with no price changes reported. Shipments were being made against previous contracts.

Nitrate of Soda

No price changes were noted and stocks were ample at most points.

Ammonium Nitrate

One large producer raised the price of this material $5.00 per ton, effective September 16th. Demand was good and buyers are anxious to fill their estimated requirements.

Nitrogenous Tankage

This material was in demand and offerings were difficult to locate, with leading producers sold ahead for the balance of the year. Some buyers were forced to use substitute materials.

Castor Pomace

With producers still out of the market, this material was in a strong position and there were a good many inquiries in the market. Last reported sales were made at $32.50, f.o.b. production points.

Organics

Some organic fertilizer materials are still too high for the fertilizer trade to use to advantage, such as tankage and blood. Last sales of tankage and blood were made at $8.00 to $8.50 per unit of ammonia ($9.72 to $10.33 per unit N), f.o.b. eastern shipping points, with the feed trade taking most of the material offered. Soybean meal had a weaker tendency due to the expected large crop, with last sales at $55.00 per ton, f.o.b. Decatur, Ill. in bulk. Linseed meal was weaker and sold down to $62.50 bulk, f.o.b. production points. Cottonseed meal maintained a fairly firm tone.

Fish Meal

With fishing still reported good along the Atlantic Coast, this material was moving slowly and while offerings were being made at $130.00 to $135.00, f.o.b. fish factories, few sales were reported as most buyers preferred to wait. A few imported lots were offered in line with the domestic market.

Bone Meal

This material was stronger due to the better demand from the feed trade. Some buyers covered their requirements for a considerable period ahead.

Hoof Meal

Market was quoted nominally at $7.25 per unit of ammonia ($8.82 per unit N), delivered Chicago. Demand was fairly good from most sections.

Low Grade Organics

Due to the shortage of high grade organics, many buyers are resorting to using organics with lower nitrogen content to tide them over until some of the high test material becomes available.

Superphosphate

Triple superphosphate remains fairly tight for quick shipment and producers are shipping against contracts as fast as produced. No price changes were reported in the 20 per cent material.

Potash

While offerings continue to be made of foreign potash which is presumed to originate in Russian territory, buyers remain indifferent even though prices in some cases are below the domestic market.

PHILADELPHIA

Market Beginning To Show Increased Interest. Foreign Materials on Market. Contract Shipments Steady

PHILADELPHIA, Sept. 13, 1950

The general fertilizer materials market, while not strikingly active, is more alive than usual for this season of the year. There is cautious inquiry for most of the materials, particularly nitrogen and potash, but there is no disposition to pay premium prices. Tankage and blood have been in active demand at higher prices, but presently some of the interest seems to be subsiding. Fish scrap is easier. Considerable foreign material of all kinds is available to the trade at figures quite competitive with domestic prices. Domestic production of most materials is sold well ahead on contract, and it is indicated that many buyers are anxious to increase their tonnage. The sulphate of ammonia supply is tightening, and Canadian ammonium nitrate is scheduled for a price advance very shortly.

Sulphate of Ammonia.—Production is well under contract and the supply beginning to tighten. Several of the producing plants in the west and south have advanced their price three dollars per ton.

Ammonium Nitrate.—Practically the entire production is sold ahead and supply position is exceedingly tight. It is reported that the Canadian price will be advanced September 15th to $63.00 per ton at the works.

Nitrate of Soda.—Fair demand continues for top-dressing and while

domestic production is restricted by strikes, stocks are reported ample to meet the fertilizer demand. Recent imports have been well under the same period in 1949.

Blood, Tankage, Bone—Since last report blood and tankage advanced as much as $1.25 to $1.50 per unit of ammonia per ton, with sales as high as $8.50 ($10.33 per unit N), but at the moment the market shows signs of easing off. Bone meal is reported firmer, but no change in prices.

Castor Pomace.—While there is quite active demand, there are no new offerings in the market.

Fish Scrap.—Fishing operations are reported good and supplies quite ample. Scrap is quoted at $122.50, and while menhaden meal is priced at $130.00 to $135.00 per ton. This is more or less nominal since there is no buying interest in evidence.

Phosphate Rock.—Movement is principally against standing contracts, with export interest reported active.

Superphosphate.—The market is in normal position for this season and no price changes. Shipments continue in fair volume against contracts.

Potash.—Production continues at full capacity with movement confined mostly to deliveries against standing contracts. Demand, however, is ahead of present domestic supply and interest is again being shown in foreign material.

CHARLESTON

Adequate Supplies of Principal Materials Expected. Some Increase in Price of Ammonium Nitrate and Sulphate.

CHARLESTON, Sept. 11, 1950

No serious shortage of the prime ingredients, nitrogen, superphos- and potash appear likely for the new season. Triple superphosphate and potash may enjoy heavier demand than supply, probably maintaining the market in a tight position through the season.

Organics.—Organics for fertilizer use continue in tight position, with the major producers of nitrogenous tankage sold up for several months ahead. Blood and tankage have strengthened in price in the last few weeks. Offerings of imported nitrogenous tankage are scarce, last sales being at around $5.50 $5.75 per unit of ammonia ($6.68 to $6.99 per unit N), c.i.f. Atlantic port.

Castor Pomace.—Domestic producers continue to have difficulty in obtaining castor beans from abroad. Last sales of pomace were made at $32.50 per ton in bags, f.o.b. Northeastern production point. No offerings are in the market now.

Dried Ground Blood.—Trading is light due to short supplies in the Chicago area and the price is $9.00 per unit of ammonia ($10.94 per unit N), in bulk. The New York market last paid $9.00 per unit of ammonia, in bulk.

Potash. — Demand continues strong and production is at capacity levels. Demand exceeds available supply. No change in prices has been noted.

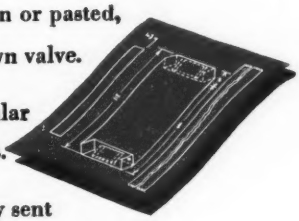
Ground Cotton Bur Ash.—Available supplies for the new season are

STRENGTH in dependable paper shipping sacks starts with KRAFT

. . . and the strongest, toughest kraft comes from our own mills, made under the watchful supervision of our own master Kraftsmen.

Then, in the most modern plant of its kind, this strong, tough kraft is fashioned into heavy-duty, multi-wall shipping sacks.

We make them in many sizes and many plies, printed or plain, either open mouth or valve, sewn or pasted, flat sewn open mouth or flat sewn valve.



In fact, we make sacks to fit your own particular specifications—or we'll design them to fit special needs.

Now, more products are economically sent to market in the strongest KRAFT all-purpose multi-wall bags yet produced.

You'll find that out when you investigate.

KRAFT BAG CORP.

GILMAN PAPER COMPANY SUBSIDIARY

Send your product to market in a "KRAFT BAG"—*the container for a thousand uses!*

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Plants at St. Marys, Georgia and Gilman, Vermont

Fall plowing time is

is nitrogen time

U·S·S Ammonium Sulphate

—in bags or bulk—will get you a big share of this plow-under business

● Fall plowing gives farmers an ideal opportunity to apply a good portion of the nitrogen that next year's crops will need. And you can obtain a good share of this profitable business by providing a nitrogen material particularly suited for fall application—U·S·S Ammonium Sulphate.

Since U·S·S Ammonium Sulphate contains all its nitrogen in the ammonium form, it won't leach out during winter rains and snows. Yet when the warm, moist growing season begins, it changes quickly into readily-available nitrate nitrogen.

U·S·S Ammonium Sulphate is available in 100-pound bags for direct application to soils that require a fall feeding of nitrogen alone. And in bulk, its non-leaching characteristics and its stability make it the best nitrogen material you can use in your complete fertilizers.

U·S·S Ammonium Sulphate can be applied by plow-sole attachment or by broadcasting. It won't corrode drills or other distributing equipment under normal conditions . . . it won't get "wet" or set in storage.

Be sure that your stocks of U·S·S Ammonium Sulphate are adequate to meet the fall demand. For prompt deliveries of bulk or bagged Sulphate, get in touch today with the nearest of our five sales offices.

To help you build sales . . .

We have prepared literature for your dealers on the advantages of *selling* U·S·S Ammonium Sulphate . . . for their farmer customers on the advantages of *using* U·S·S Ammonium Sulphate. We'll be glad to send you samples of this literature with blanks for ordering quantities you need for your promotional work.

COAL CHEMICAL SALES DIVISION
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USS

AMMONIUM SULPHATE

UNITED STATES STEEL

uncertain, but in any event will be considerably less than last season. A limited quantity is under contract at prices up to 75 cents per unit of K_2O in bulk, f.o.b. Texas production point.

Phosphate Rock.—Movement to domestic users continues steady against contracts. Prices continue firm.

Superphosphate.—Normal superphosphate prices continue steady, and the market is quiet. Demand for triple superphosphate continues far in excess of supply.

Sulphate of Ammonia.—Production is moving steadily against contract commitments. The tendency is for the market to tighten and it is reported that one small producer has increased his price $3.00 per ton, but with limited sales at the new figure.

Ammonium Nitrate.—Supply position continues tight, with both domestic and Canadian producers heavily sold for many months ahead. Effective September 15th Canadian material will be advanced to $63.00 per ton f.o.b. works, which is $5.50 per ton increase.

Nitrate of Soda.—Demand is fair for top dressing purposes and stocks entirely adequate to meet the demand.

CHICAGO

Increases Reported in Feed Organics and Market In Fairly Strong Position

CHICAGO, Sept. 11, 1950

Further advances have been established in the animal protein market during the past two weeks and at present the market is in a fairly strong position at the newly established levels. There are no indications of any weakness for the immediate future and while no drastic advances are anticipated, it is quite possible that a gradual increase in value may be looked for.

Ground and sacked meat scraps, 50 per cent protein, and ground and sacked digester tankage, 60 per cent protein, are listed at $120.00 to $125.00 per ton, f.o.b. shipping points, the price differential depending upon the area of production. Dry rendered tankage, unground, is steady at $2.10 per unit of protein delivered. Buyers are resisting further attempts at higher levels. Wet rendered tankage is generally held at $10.00 per unit of ammonia ($12.15 per unit N) with buyers' views 50 cents lower. Dried blood is steady at $9.00 per unit of ammonia ($10.94 per unit N). Steamed bone meal, 65 per cent B.P.L. in bags, is listed at $80.00 to $85.00 per ton and raw bone meal, 4½ per cent ammonia, 45 per cent B.P.L., at $65.00 to $70.00 per ton.

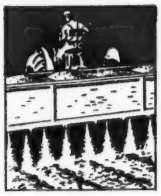
William Allen White, in giving a gift, said: "This is the last kick in a fistful of dollars I am getting rid of. I have tried to teach people there are three kicks in every dollar—one when you make it. And how I do love to make a dollar; one when you have it, and I have the Yankee lust for saving. The third kick is when you give it away, and the biggest kick of all is this last one.

Patrick Henry said: "Give me liberty or give me death!" Now too many patriots say, "Gimme!"

THESE GRANULES PROVIDE CONTROL

Only Davison uses an exclusive finishing process that produces superphosphate in granules. Davco Granulated Superphosphate thus offers you a number of sales points that you can use to make your business grow.

1. *Davco Granulated Superphosphate stores without caking, in your warehouse, in the farmer's barn. That's storage control.*



2. *It pours freely in your plant and drills freely and evenly in the field with a minimum of dusting, bridging and clogging. That's handling and application control.*

3. *Each granule has a hardened but porous surface, which releases plant food at a correct rate. That's feeding control.*

Davison is a primary producer of superphosphates, mining its own phosphate rock, producing its own acid, scientifically controlling every step of the process. Thus you get quick delivery of the highest quality, either bulk or bagged. Price puts you in a favorable competitive position.

Progress through Chemistry

THE DAVISON CHEMICAL CORPORATION

Baltimore 3, Maryland

EXCLUSIVE PRODUCERS OF GRANULATED, AND ONE OF THE OLDEST AND LARGEST PRODUCERS OF NORMAL GRADES OF SUPERPHOSPHATES

Smith Elected President of John Powell & Co.

H. Alvin Smith, Executive Vice President of John Powell & Co., Inc., Mew York, manufacturers of agricultural chemicals and insecticides, was elected to the office of President of the Company at a recent meeting of the Board of Directors.

H. Alvin Smith

W. J. Pollert, Vice-President, previously in charge of production, was put in complete charge of all operations.

Dr. Alfred Weed, who headed domestic sales, is now director of sales and promotion.

Mr. Smith is a graduate of New York University. He joined the Powell organization in 1941, became Treasurer in 1943 and Vice-President in 1945. When Mr. Powell resigned in 1948, Mr. Smith was appointed Chief Executive.

Since then the Company has embarked upon a progressive program to expand its services. Early this year new facilities were originated and constructed at Huntsville, Alabama, and a network of coast-to-coast stocking points established.

There is so much to know, and so little time in which to learn it, that most of us prefer to let others do our thinking for us. We merely select from their writings the views which most readily conform with our prejudices, condone our passions, and justify our profits.—Harris in Chicago Daily News.

NEW MONSANTO PHOSPHORUS FURNACE

Construction under way on the largest electric phosphorus furnace being built by Monsanto Chemical Company at their Monsanto, Tenn., plant. With a capacity of 25,000 kw., it is expected to begin the production of elemental phosphorus during January, 1951.

A bewildered man entered a woman's specialty shop. "I want a girdle for my wife," he said.

"What bust?" asked the clerk.

"Nothing, it just wore out."

Baughman

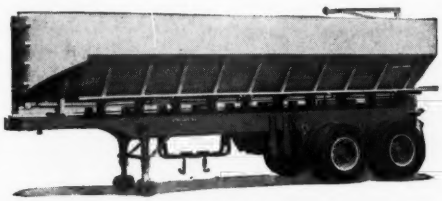
MODEL O-2 ATTACHMENT

spreads rock phosphate faster and more economically than any other method

Specially designed to prevent material from packing and crusting—perfect for spreading rock phosphate, dry powdered lime and other fertilizing materials.

Spreads from 100 to 5,000 pounds per acre . . . covers 2 acres for every mile traveled at speeds up to 15 mph. Gives uniform spreads on the level, slopes or hillsides. Spreads 16½ feet widths.

The Model O-2 is 16½' wide . . . folds for highway travel.



"HI-SPEED" LOW COST TRANSPORT

For efficient bulk hauling of superphosphate. Positive belt drive conveyor in bottom of body unloads quickly and with minimum agitation. Compartmentized. Waterproof roof can be installed. Standard sizes—no high cost of special construction.

BAUGHMAN also builds bodies for hauling rock phosphate, limestone and other commercial fertilizers. A model for your every need.

MODEL 235 HOLDS SPREADS TO THE GROUND

For Model K, K-2 and K-3 Bodies . . . prevents wind from scattering spreads. Confines air blast from distributor . . . directs materials outward and groundward. Causes the spread to LAY and STICK. Spreads limestone up to 30 feet . . . phosphate and other fertilizers up to 20 feet. Opens to 18 feet quickly and easily . . . folds for highway travel.

WRITE . . . for complete details of BAUGHMAN fertilizer handling and spreading equipment

MODEL Q PORTABLE CONVEYOR

Loads and unloads from the horizontal to 60°. Capacity up to 40 bu. per minute. Big 9" conveyor screw handles any dry, powdered or granular materials. Available with or without wheels—hundreds of applications

BAUGHMAN MANUFACTURING CO., Inc.

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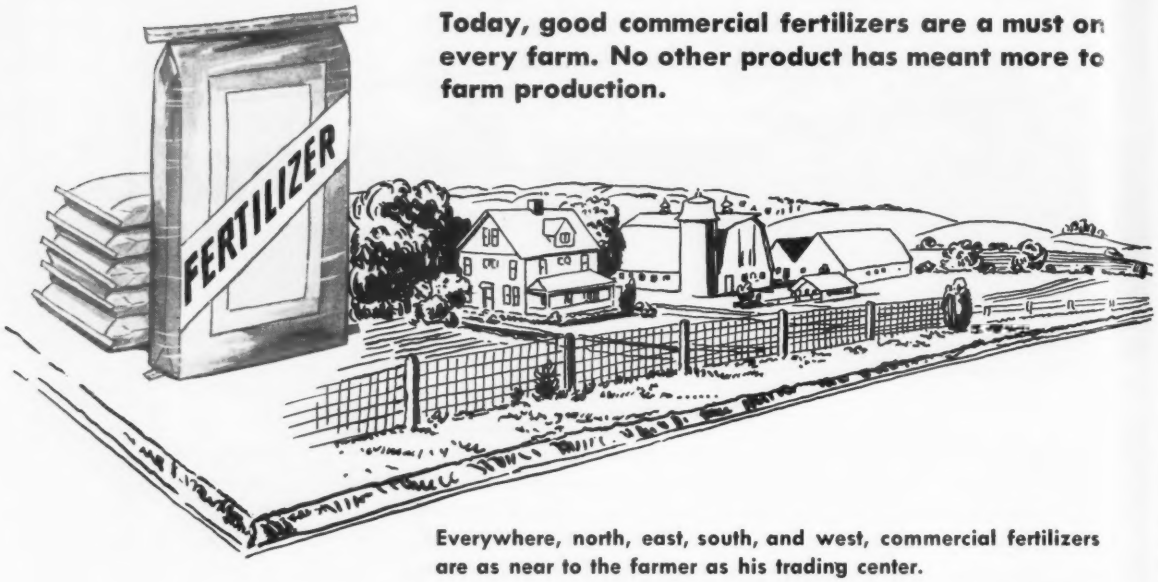
"The Pioneers of the Lime Spreading Industry"



Today, good commercial fertilizers are a must on every farm. No other product has meant more to farm production.

Everywhere, north, east, south, and west, commercial fertilizers are as near to the farmer as his trading center.

Fertilizers today, packed in modern, compact, easy-to-handle Raymond Multi-Wall Paper Shipping Sacks, simplify the dealer's and consumer's handling problems.

Specify CUSTOM BUILT Raymond Shipping Sacks for your fertilizers. They are made in various sizes, types, and strengths—printed or plain. They're sift-proof, dust-proof, and water-resistant.

THE RAYMOND BAG COMPANY, Middletown, O.

Raymond

Multi-Wall PAPER SHIPPING SACKS


ANHYDROUS AMMONIA
BENZENE HEXACHLORIDE
ETHYL FORMATE
METALDEHYDE
SIXIDE®
B·Y-16
B·Y-21®
B·Y-500
Niacin
Condensed Distillers' Molasses Solubles
Choline Supplement 25
Choline Chloride, 70% Aqueous
all signs point to CSC
Here is one source for 12 different agricultural chemicals important to manufacturers and users of feeds, fertilizers, and insecticides. Whether it's for a jar-size sample or tank-car tonnage, follow the signs to CSC.
did you know?
CSC was first to produce riboflavin biologically and first to market this product.
CSC was first in the promising field of nitroparaffins for Agriculture and Industry.
CSC was the first company to produce crystalline penicillin on a large scale.
CSC was the first commercial producer of another important antibiotic, bacitracin.
CSC pioneered the research of benzene hexachloride in this country.
CSC makes over 200 diversified products which serve every major industry. These are marketed through five sales divisions: Agricultural, Industrial Chemicals, Pharmaceutical, Automotive Specialties, and Beverage.
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New IPC Chemical A Success

The new alphabetical weed killer, IPC, that was humorously hailed as the eventual successor to the lawn mower in press releases recently because of its grass growth control capabilities, in reality shows tremendous promise as a selective grass killer in a variety of crops, according to Virgil Freed, associate agronomist, for the Oregon State College Agricultural Experiment Station.

The work with IPC as a lawn grass growth regulator—it produces a stunted but uniform height grass that stays green—is in its earliest experimental stages, Freed says. But IPC's uses as a weedy grass killer in legume seed crops, vegetable crops, strawberries, orchards and perennial grasses are advanced enough to tab the chemical nearly as valuable as 2,4-D.

Discovered in England but tried there and in other places without much success, IPC's remarkable possibilities have come to light almost exclusively through the efforts of Freed and his associates at the experiment station.

Freed cites a field trial on the Otto Bohnert farm near Medford as an example of IPC's worth. There a 60-acre field of Ladino clover had been taken over by grassy weeds to the point where the average yield of seed was only 80 pounds per acre. Application of IPC eliminated the grasses and the average yield jumped to 250 pounds per acre. Control of many grassy weeds in other crops has been almost as promising.

The best time for application of IPC is at the time of germination of the weedy grasses. Because of its slight solubility in water, however, it is possible to control well-established shallow-rooted annual grass plants by letting rainfall or overhead irrigation water carry the material into the rooting zone of the plant. When applied in oil, IPC effectively controls quackgrass.

Official name of the cehmical, incidentally, is O-Iso-propyl-N-phenyl carbamate.

California Issues Warning

Those labels and printed warnings on containers should be strictly followed, warns Dr. A. E. Michelbacher, assistant professor of entomology of the University of California at Berkeley. He urges California fruit and vegetable growers to practice extreme caution in handling insecticides.

Applications should be timely and made when precisely necessary. By all means indiscriminate use of poisonous materials should be avoided.

Growers should see to it that no poisonous residue remains on fruit or edible portions of vegetables. In addition, states Dr. Michelbacher, no dust or spray should enter adjacent fields to provide a danger for bees or livestock.

The proper equipment for application is also important. Appropriate gear for the operator assists in protecting him. Clothes should be removed immediately after contamination and the hands, exposed arms, and face thoroughly washed.

All stored insecticides should be plainly labeled.

INSECTICIDE

(*Continued from page 11*)

¼ pint of Systox in various concentrations per plant. After several days, aphids were introduced to the leaves of the plants. The following data demonstrates the per cent of aphids killed in various lengths of time after applications:

Concentration	*1 1/2 hrs.*	*3 hrs.*	*20 hrs.*	*4 days*
0.3%	10	80	100	...
0.15%	..	70	100	...
0.03%	..	10	40	100

In still another test where plants were sprayed to control aphids using 0.6 per cent concentrations, insect control was received as follows:

Material	*Average No. Living Aphids per Plant* 2 days	6 days
E-1059	2	1
Octamethyl pyrophosphoramide	13	21
Check	13	19

Tests were carried out with regard to the control of two-spotted spider mites on beans. Systox was applied at various rates of active ingredients per 1,000 square feet of soil so that the chemical may be absorbed through the roots of the plants. The results:

Material	*Conc. (lbs. per 1000 cu. ft.)*	*Average % Mortality* 2 days	6 days
E-1059	0.55	63.7	90.2
	1.1	78.9	99.6
Octamethyl pyrophosphoramide	0.55	10.7	30.7
	1.1	16.7	67.3
Check	....	3.0	3.0
	....	5.7	4.8

Systox presents many unique possibilities as a new type of insect control since research so far reveals that there is very little danger of burning plants from the use of this chemical. It should be possible to treat seedlings before they are transplanted in the field. Further, there is a possibility of blending the chemical with fertilizers to be applied at the time of planting, or incorporating the chemical with other ingredients that might be used for the pelletizing of seeds.

Small amounts of the formulation of this new insecticide will be available immediately for further investigation by recognized agricultural authorities and in the near future sufficient material will be available for large scale field tests.

SULPHURIC ACID

(*Continued from page 10*)

fer is by gravity flow, thus eliminating the need for transfer pumps.

Pease-Anthony Venturi Scrubbers

The venturi scrubber consists essentially of a venturi tube. Mist laden gases leaving the low stage absorber are scrubbed in the throat at a high velocity by means of a recirculated stream of dilute sulphuric acid solution. The high degree of turbulence prevailing in the venturi throat achieves very intimate contact between the gas and scrubbing medium. This results in practically complete capture of the sulphuric acid mist particles. Entrained liquid leaving the venturi is removed from the gas stream in a cyclone type mist separator. Exit gases contain only about one-tenth of the acid mist which leaves a conventional contact plant absorption tower. The visible exit from the stack is a plume of steam which disappears within a short distance of the plant.

GRANULE SIZE

(*Continued from page 9*)

shows the favorable influence of the granules compared with the powdered superphosphate.

Table III summarizes yields, increases, and the relative value or ratios.

Comments of Table III

The yield data confirm the photographic representation; they show that the coarsest fraction induced about 22 per cent more yield than the finest.

Experiments in 1939–40. 1. Series: with winter rye, v. Carstens. Soil, sandy loam, low organic matter, pH 4.9 to 4.1, strongly acid.

Figures 3 and 4: Figure 3 photo taken at heading out stage; Figure 4 at dough stage. Granulated Super D used in both series. Pot numbers represent granule size as follows:
Pot 183, check—no phosphate
Pot 183, original material < 1.0 mm
Pot 185, 1.0–2.0 mm
Pot 189, 2.0–3.0 mm
Pot 193, 3.0–5.0 mm

2. Series: winter wheat, v. Carstens, heavy head. Soil, acid, low organic matter, sandy loam, pH 5.5 to 4.9. Even though the photographs might not fully reveal it, the data show in this series also that the granulated material produced the better crops.

In this wheat series, the granulated material of mesh sizes up to 2–3 mm produced a large and increasingly better yield compared with the powdered superphosphate. The fraction 3–5 mm gave about the same yield that the 2–3 mm size gave.

A brief summary of these wheat tests is tabulated in Table VI, in which the yield increases are compared with the check pot which received only N-K nutrients.

Summary of Results From Granulated Superphosphate

The results with granulated superphosphate can be expressed briefly as follows:

a. *White oats.* In this series of summer cereal, the yields increased correspondingly with increase in size of granules, with this difference, that the level of increased yields are on a somewhat lower plane than in the tests with the winter cereals. The smallest sized granules (< 0.5 and 0.5–1 mm) are apparently too fine for best results and produce no better yields than the powdered superphosphate.

b. *Spring wheat.* The yields in this series of tests are on a lower level generally which, made it difficult to calculate relative data. The granules induced only a slight increase in yield, and there was no corresponding increase with increase in granule size.

(*To be concluded in the next issue*)

TABLE III. YIELDS, YIELD INCREASES, AND RELATIVE VALUES

Fertilization	*Granule size mm*	*Total yield dry basis in gm/pot*	*Increase due to P_2O_5*		*Total yield normal super = 100*
			gm	*%*	
Check	.....	39.1 ± 0.19	....	.....	53.1
Plus granulated super	<1.0	76.1 ± 1.01	37.0	94.6	103.4
	1.0–2.0	80.6 ± 0.70	41.5	106.1	109.5
	2.0–3.0	79.3 ± 1.19	40.2	102.8	107.7
	3.0–5.0	84.8 ± 1.22	45.7	116.9	115.2
Plus normal super	.....	73.6 ± 1.54	34.5	88.2	100

TABLE IV. YIELDS, YIELD INCREASES, AND RELATIVE VALUES

Fertilization $N:P_2O_5:K_2O$ = 300:100:360 kg/h	*Granule size mm*	*Total yield dry basis average of 4 parallel tests*	*Increase due to P_2O_5*		*Total yield original super = 100*
			gm	*%*	
Check	...	47.9 ± 0.60	....	....	58.8
Plus granulated super	1–2	87.3 ± 0.58	39.4	82.3	107.2
	2–3	86.9 ± 0.94	39.0	81.4	106.8
	3–5	93.0 ± 0.77	45.1	94.2	114.3
Plus original super crushed	<1	81.4 ± 1.51	33.5	69.9	100

TABLE V. YIELDS, YIELD INCREASES, AND RELATIVE VALUES

Fertilization $N:P_2G_5:K_2O$ = 300:100:360 kg/h	*Granule size mm*	*Total yield dry basis average of 4 parallel tests*	*Increase due to P_2O_5*		*Total yield original super = 100*
			gm	*%*	
Check	...	42.3 ± 0.33	....	.....	57.2
Plus granulated super	1–2	88.4 ± 1.03	46.1	109.0	119.5
	2–3	93.9 ± 2.10	51.6	122.0	126.9
	3–5	93.0 ± 1.47	50.7	119.9	125.7
Plus original super crushed	<1	74.0 ± 0.81	31.7	74.9	100

TABLE VI. PERCENTAGE INCREASE COMPARISON WITH N-K BASIC FERTILIZATION OF 100 KG. P_2O_5 IN THE FORM OF GRANULATED AND ORIGINAL, CRUSHED SUPERPHOSPHATE

Crop	*Original super crushed <1 mm*	*Granulated super*			
		<1 mm	*1–2 mm*	*2–3 mm*	*3–5 mm*
Winter wheat, 1938–39	....	94.6	106.1	102.8	116.9
Winter rye, 1939–40	69.9	....	82.3	81.4	94.2
Winter wheat, 1939–40	74.9	....	109.0	122.0	119.9

NITROGEN SERVICE

FOR FERTILIZER MANUFACTURERS

- **Lion Anhydrous Ammonia** . . . Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.
- **Lion Aqua Ammonia** . . . This product is available to manufacturers for use in the formulation of mixed fertilizers or for sale as direct application material. Normally about 30% ammonia, its content can be controlled by order to suit your needs.
- **Lion Nitrogen Fertilizer Solutions** . . . Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.
- **Lion Ammonium Nitrate Fertilizer** . . . The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.
- **Lion Sulphate of Ammonia** . . . This new, superior-type sulphate is guaranteed to contain a minimum of 21% nitrogen. Through special conditioning of the larger crystals, moisture and free acid content is greatly reduced. These factors, together with the special coating applied, make for greater resistance to caking in shipment or in storage. This product flows freely. It is shipped in bulk and in 100-pound, 5-ply bags laminated with asphalt.

"Serving Southern States"

LION OIL COMPANY
CHEMICAL DIVISION
El Dorado, Arkansas

Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking. Just write.

BUYERS' GUIDE • Classified Index to Advertisers in "American Fertilizer & Allied Chemicals"

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Commercial Solvents Corp., New York City
Lion Oil Co. El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE
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Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

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Mente & Co. Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Cotton
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Mente & Co. Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va

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Bemis Bro. Bag Co., St. Louis, Mo.
International Paper Co., Bagpak Div., New York City
Jaite Company, The, Jaite, Ohio
Kraft Bag Corporation, New York City
Mente & Co. Inc., New Orleans, La.
Raymond Bag Co., Middletown, Ohio
St. Regis Paper Co., New York City
Virginia Carolina Chemical Corp., Richmond, Va.

BAGS—Dealers and Brokers
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McIver & Son, Alex. M., Charleston, S. C.

BAG CLOSING MACHINES
International Paper Co., Bagpak Div., New York City
St. Regis Paper Co., New York City

BAG PRINTING MACHINES
Schmutz Mfg. Co., Louisville, Ky.

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St. Regis Paper Co., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

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Davidson Commission Co., The, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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American Potash and Chem. Corp., New York City

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Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

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Hayward Company, The, New York City

BUCKETS—Elevator
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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Mach. Works, Aurora, Ind.

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CASTOR POMACE
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Barrett Div., Allied Chemical & Dye Corp., New YorkCity
Commercial Solvents Corp., New York City
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Koppers Company Inc., Tar Products Div., Pittsburgh, Pa.
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Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.
United States Steel Corp., New York City
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.
Woodward Iron Company, Woodward, Ala.

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Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agricultural Chemical Co., New York City

LEAD BURNERS
Southern Lead Burning Co., Atlanta, Ga.

LIMESTONE
American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

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Hough Co., The Frank G., Libertyville, Ill.
Link-Belt Company, Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

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Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
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Stedman Foundry and Mach. Works, Aurora, Ind.

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Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

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Atlanta Utility Works, The, East Point, Ga.
Baughman Manufacturing Co., Jerseyville, Ill.
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Hough Co., The Frank G., Libertyville, Ill.
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MACHINERY—Superphosphate Manufacturing
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McIver & Son, Alex. M., Charleston, S. C.
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Summers Fertilizer Co., Baltimore, Md.
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Monsanto Chemical Co., St. Louis, Mo.
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Potash Co. of America, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
United States Potash Co., New York City

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- Virginia-Carolina Chemical Corp., Richmond, Va.

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- Baker & Bro., H. J., New York City
- Davidson Commission Co., The, Chicago, Ill.
- International Minerals & Chemical Corporation, Chicago, Ill.
- Jackle, Frank R., New York City
- McIver & Son, Alex. M., Charleston, S. C.
- Woodward & Dickerson, Inc., Philadelphia, Pa.

VALVES
- Atlanta Utility Works, The, East Point, Ga.
- Monarch Mfg. Works, Inc., Philadelphia, Pa.

Alphabetical List of Advertisers

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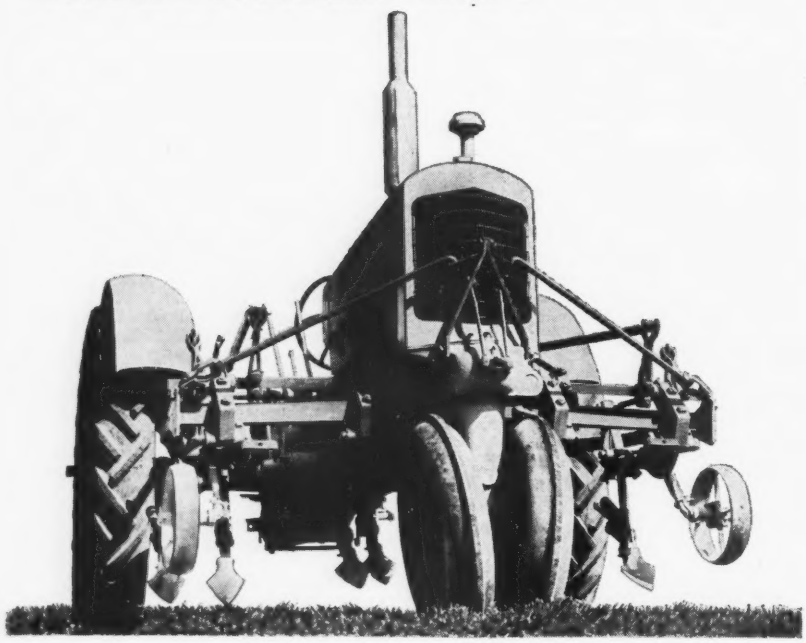

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In the past century, mechanization has wrought far greater changes on the farm than ever took place before in recorded history. What the next century will bring to agriculture, no one can imagine—but the advances promise to be tremendous.

In these advances, an important part will be played through the rapidly increasing use of chemical fertilizers. Many of these are compounded with potash—often with Sunshine State Potash, a product of New Mexico. For this natural soil nutrient increases soil fertility, and builds up greater resistance to plant diseases and drought.

SUNSHINE STATE POTASH
PRODUCT OF NEW MEXICO U.S.A.

Reg. U. S. Pat. Off.

HIGRADE MURIATE OF POTASH
62/63% K_2O
GRANULAR MURIATE OF POTASH
50/52% K_2O
MANURE SALTS 20% MIN. K_2O

UNITED STATES POTASH COMPANY, *Incorporated*, 30 Rockefeller Plaza, New York 20, N. Y.

1850

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1950

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The coming century presents a many sided challenge:

1. Increasing Populations.
2. Increasing Standards of Living.
3. Increasing Economic Problems.
4. And above all, an Increasing and Urgent Demand for the Preservation of the Fertility and Productivity of our Greatest Heritage—The Good Earth.

We pledge our best efforts to the attainment of all constructive objectives.

POTASH COMPANY OF AMERICA
Carlsbad, New Mexico

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MIDWESTERN SALES OFFICE... First National Bank Bldg., Peoria, Ill.
SOUTHERN SALES OFFICE... Candler Building, Atlanta, Ga.

CHEMICO
announces
A NEW WAY
to make
Sulfuric Acid

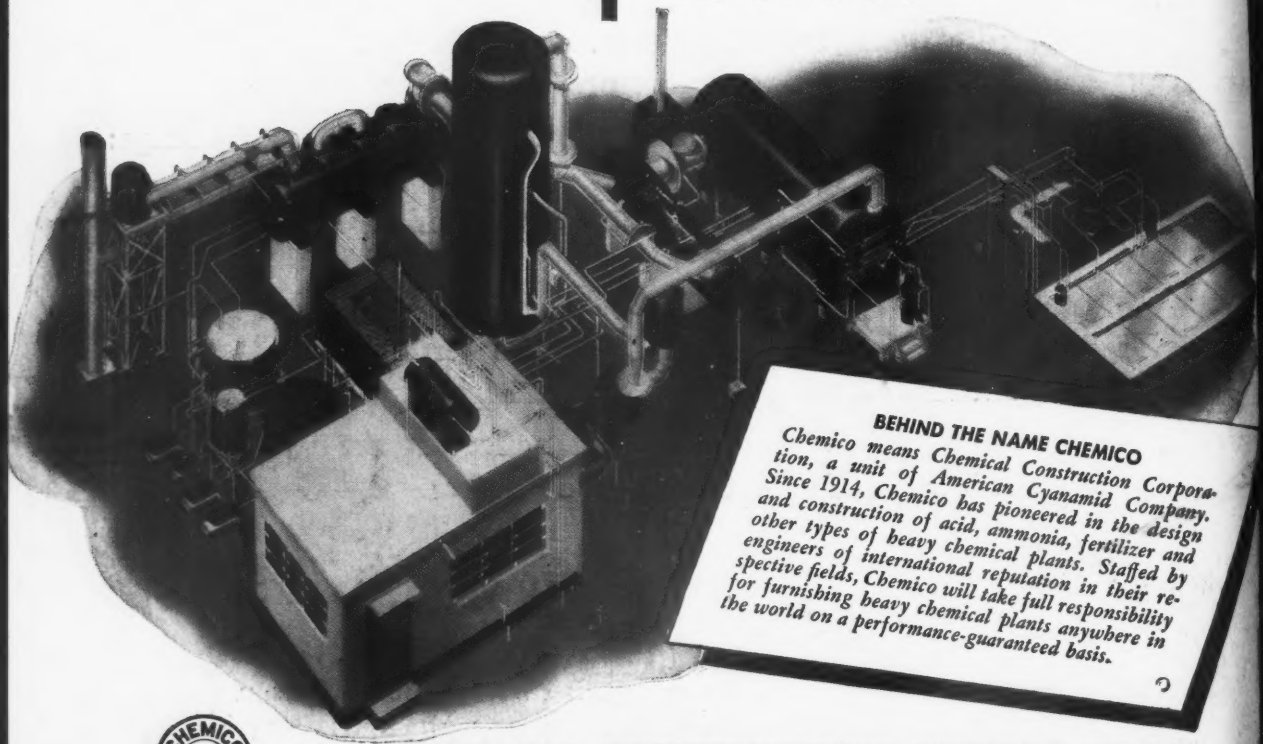
Whether you make or buy sulfuric acid, this simple new-type Chemico plant will be of special interest to you. Here's why . . .

Chemico's new process for manufacturing sulfuric acid from sulfur makes it possible for you to *replace* or *enlarge* your present facilities *at considerably less cost* than for the standard type contact plant.

The simplicity of this new Chemico plant is the basic reason for its low cost. *These seven major items of equipment* — usually found in present-type contact acid plants — *have been eliminated*: drying tower, gas filter, heat exchanger, SO_3 cooler, acid coolers, acid circulating and transfer pumps, and diluting equipment. In addition, the distinctive features listed below assure more efficient production.

DISTINCTIVE FEATURES

- A quench converter eliminates heat exchangers . . . assures higher yield from raw sulfur . . . virtually eliminates atmospheric contamination due to unconverted SO_2.
- A multiple-stage dip-pipe absorption system, operating by gravity flow, eliminates the need to distribute acid over packed absorbing towers.
- Water evaporation from absorber acid solutions removes heat of absorption and the sensible heat of the hot gases. Only the product acid requires cooling before storage.
- A built-in Pease-Anthony Venturi Scrubber insures mist elimination in the exhaust stack.
- Plants of this new type deliver sulfuric acid of any strength up to 95% H_2SO_4.



BEHIND THE NAME CHEMICO

Chemico means Chemical Construction Corporation, a unit of American Cyanamid Company. Since 1914, Chemico has pioneered in the design and construction of acid, ammonia, fertilizer and other types of heavy chemical plants. Staffed by engineers of international reputation in their respective fields, Chemico will take full responsibility for furnishing heavy chemical plants anywhere in the world on a performance-guaranteed basis.

Chemico plants are profitable investments

CHEMICAL CONSTRUCTION CORPORATION

CONSULTING, DESIGNING AND CONTRACTING ENGINEERS

488 MADISON AVENUE, NEW YORK 22, NEW YORK

EUROPEAN TECHNICAL REPRESENTATIVE

CYANAMID PRODUCTS, LTD., LONDON W.C.2, ENGLAND • CABLES: CHEMICONST, NEW YORK

CHEMICO
announces
A NEW WAY
to make
Sulfuric Acid

Whether you make or buy sulfuric acid, this simple new-type Chemico plant will be of special interest to you. Here's why . . .

Chemico's new process for manufacturing sulfuric acid from sulfur makes it possible for you to *replace* or *enlarge* your present facilities *at considerably less cost* than for the standard type contact plant.

The simplicity of this new Chemico plant is the basic reason for its low cost. *These seven major items of equipment* — usually found in present-type contact acid plants — *have been eliminated*: drying tower, gas filter, heat exchanger, SO_3 cooler, acid coolers, acid circulating and transfer pumps, and diluting equipment. In addition, the distinctive features listed below assure more efficient production.

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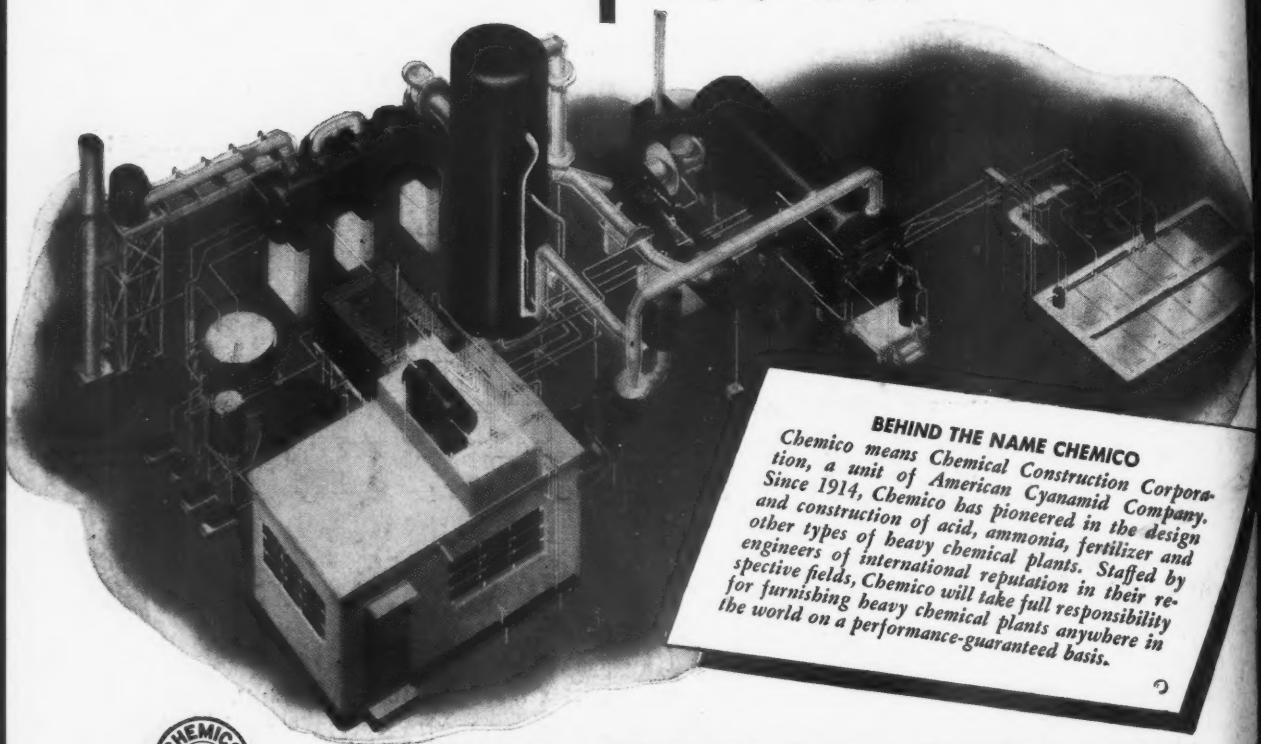
- A built-in Pease-Anthony Venturi Scrubber insures mist elimination in the exhaust stack.
- Plants of this new type deliver sulfuric acid of any strength up to 95% H_2SO_4.



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Chemico plants are profitable investments

CHEMICAL CONSTRUCTION CORPORATION

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